



9810089_final.txt

SEQUENCE LISTING

<110> Dan Nilsson
 Thomas Janzen
 <120> Method of preventing bacteriophage
 infection of bacterial cultures

 <130> 21134 PC 1
 <150> PA 1998 00878
 <151> 1998-07-03
 <150> US 60/091,735
 <151> 1998-07-06
 <160> 6
 <170> FastSEQ for Windows Version 3.0

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 <223> PCR-primer for the construction of plasmid with
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 <213> STRAIN: MG1363
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 Ser Lys Ala Leu Leu Glu Val Ala Arg Glu Lys Gly Gln Leu Glu Ala
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 ATT CTT ACT GAA GTT AGC GAA ATG ATT CAG CTT TTC AAA GAA AAT AAC 148
 Ile Leu Thr Glu Val Ser Glu Met Ile Gln Leu Phe Lys Glu Asn Asn
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 GAA TTG ATT GAT ACT TTG CTT CAA ACT TCA TCA GAA GTG ATG TCA AAT 244
 Glu Leu Ile Asp Thr Leu Leu Gln Thr Ser Ser Glu Val Met Ser Asn
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 TTC CTG AAT ACT ATT CGT TCT AAT GGA CGT CTA GCT GAC CTC GGA GAA 292
 Phe Leu Asn Thr Ile Arg Ser Asn Gly Arg Leu Ala Asp Leu Gly Glu
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 ATA CTT GAA GAA ACT AAA AAT GCA GCA GAT GAC ATG TTC AAA ATT GCT 340
 Ile Leu Glu Glu Thr Lys Asn Ala Ala Asp Met Phe Lys Ile Ala
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 GAC GTT GAA GTT GTT TCA AGT ATT GCA TTG TCA GAA GCT CAA ATT GAA 388
 Asp Val Glu Val Val Ser Ser Ile Ala Leu Ser Glu Ala Gln Ile Glu
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 Lys Phe Lys Ala Met Ala Lys Ser Lys Phe Asp Leu Asn Glu Val Thr
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 Val Ile Asn Thr Val Asn Glu Lys Ile Leu Gly Gly Phe Ile Val Asn
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 Ser Arg Gly Lys Ile Ile Asp Ala Ser Leu Lys Thr Gln Leu Ala Lys
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9810089_final.txt

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	GGA	CTT	GGA	GAA	CTT	AAT	ACA	GGT	AAA	ACT	CGT	CCA	GTT	GAA	GCA	AAA	1137			
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	GCT	CCT	GGT	GTT	ATG	CAA	CGT	AAA	TCA	GTC	TCT	GAG	CCA	TTA	CAA	ACT	1185			
	Ala	Pro	Gly	Val	Met	Gln	Arg	Lys	Ser	Val	Ser	Glu	Pro	Leu	Gln	Thr				
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	Arg	Lys	Leu	Gly	Ala	Met	Asp	Tyr	Thr	Ile	Val	Val	Thr	Ala	Ser	Ala				
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	Ser	Gln	Pro	Ser	Pro	Leu	Leu	Tyr	Ile	Ala	Pro	Tyr	Ala	Gly	Ala	Ala				
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	ATG	GGT	GAA	GAA	TTT	ATG	TAT	AAC	GGT	AAA	CAT	GTC	TTG	GTT	GTT	TAT	1521			
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	Asp	Asp	Leu	Ser	Lys	Gln	Ala	Val	Ala	Tyr	Arg	Glu	Leu	Ser	Leu	Leu				
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	Leu	Arg	Arg	Pro	Pro	Gly	Arg	Glu	Ala	Tyr	Pro	Gly	Asp	Val	Phe	Tyr				
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	TTG	CAC	TCA	CGT	CTT	TTG	GAA	CGT	GCT	GCT	AAA	TTG	TCT	GAT	GAT	CTT	1665			
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	GAT	ATC	TCA	GCT	TAT	ATT	CCA	ACA	AAC	GTT	ATC	TCT	ATT	ACC	GAC	GGT	1761			
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9810089_final.txt

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Lys	Ala	Met	Lys	Lys	Val	Ala	Gly	Thr	Leu	Arg	Leu	Asp	Leu	Ala	Ser			
TTC	CGT	GAA	CTT	GAA	GCC	TTT	ACA	CAA	TTT	GGT	TCT	GAC	CTT	GAT	GAA		1953	
Phe	Arg	Glu	Leu	Glu	Ala	Phe	Thr	Gln	Phe	Gly	Ser	Asp	Leu	Asp	Glu			
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405	AAA	CAA	CCA	TTG	CAC	AAA	CCA	TTG	GCT	GTT	GAA	AAA	CAA	GTT	TTG	ATT	2049	
Lys	Gln	Pro	Leu	His	Lys	Pro	Leu	Ala	Val	Glu	Lys	Gln	Val	Leu	Ile			
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GTT	CTT	GAT	TTT	GAA	ACT	AAA	ATG	TTC	GAT	TTC	TTC	GAT	GCA	AAT	TAT		2145	
Val	Leu	Asp	Phe	Glu	Thr	Lys	Met	Phe	Asp	Phe	Phe	Asp	Ala	Asn	Tyr			
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Ala	Asp	Leu	Leu	Asn	Val	Ile	Thr	Asp	Thr	Lys	Asp	Leu	Pro	Glu	Glu			
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Thr	Glu	Ala	Val	Glu	Glu	Tyr	Gln	Ala	Glu	Glu	Phe	Asp	Glu	Leu	Tyr			
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9810089_final.txt

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AAA	GTT	GTC	GAT	TTA	CTT	GCC	CCT	TAT	CTT	AAA	GGT	GGG	AAA	GTC	GGA	3759																																
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GTT	GGC	GAT	CGT	ACT	CGT	GAC	GGG	AAT	GAC	CTT	TAC	TGG	GAA	ATG	AAA	3903																																
Val	Gly	Asp	Arg	Thr	Arg	Asp	Gly	Asn	Asp	Leu	Tyr	Trp	Glu	Met	Lys																																	

9810089_final.txt

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GAA	TCA	GGC	GTT	ATT	GAA	AAA	ACA	GCC	ATG	GTC	TTT	GGT	CAA	ATG	AAT			3951
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GAA	CCA	CCT	GGA	GCA	CGT	ATG	CGT	GTT	GCC	CTT	ACT	GGT	TTA	ACA	ATT			3999
Glu	Pro	Pro	Gly	Ala	Arg	Met	Arg	Val	Ala	Leu	Thr	Gly	Leu	Thr	Ile			
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GCG	GAA	TAT	TTC	CGT	GAT	GTT	CAA	GGA	CAA	GAC	GTA	TTG	CTT	TTC	ATC			4047
Ala	Glu	Tyr	Phe	Arg	Asp	Val	Gln	Gly	Gln	Asp	Val	Leu	Leu	Phe	Ile			
	235				240					245								
GAT	AAC	ATC	TTC	CGT	TTC	ACT	CAA	GCT	GGT	TCA	GAA	GTT	TCT	GCC	CTT			4095
Asp	Asn	Ile	Phe	Arg	Phe	Thr	Gln	Ala	Gly	Ser	Glu	Val	Ser	Ala	Leu			
	250				255				260					265				
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Trp	Gly	Arg	Met	Pro	Ser	Ala	Val	Gly	Tyr	Gln	Pro	Thr	Leu	Ala	Thr			
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GAA	ATG	GTT	CAA	TTA	CAG	GAA	CGT	ATC	ACT	TCT	ACT	AAG	AAG	GGT	TCT			4191
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GTT	ACA	TCT	ATC	CCA	GCG	ATT	TAT	GTC	CCT	GCC	GAT	GAC	TAT	ACT	GAC			4239
Val	Thr	Ser	Ile	Pro	Ala	Ile	Tyr	Val	Pro	Ala	Asp	Asp	Tyr	Thr	Asp			
		300					305					310						
CCA	GCG	CCA	GCT	ACA	GCC	TTC	GCT	CAC	TTG	GAC	GCA	ACA	ACT	AAC	TTG			4287
Pro	Ala	Pro	Ala	Thr	Ala	Phe	Ala	His	Leu	Asp	Ala	Thr	Thr	Asn	Leu			
	315					320					325							
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Glu	Arg	Arg	Leu	Thr	Gln	Met	Gly	Ile	Tyr	Pro	Ala	Val	Asp	Pro	Leu			
	330				335					340				345				
GCT	TCA	TCA	TCA	CGT	GCG	CTT	ACA	CCT	GAA	ATT	GTT	GGT	GAA	GAA	CAC			4383
Ala	Ser	Ser	Ser	Arg	Ala	Leu	Thr	Pro	Glu	Ile	Val	Gly	Glu	Glu	His			
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TAT	GAA	GTT	GCA	ATG	GAA	GTT	CAA	CGT	GTC	CTT	CAA	CGC	TAC	AAA	GAA			4431
Tyr	Glu	Val	Ala	Met	Glu	Val	Gln	Arg	Val	Leu	Gln	Arg	Tyr	Lys	Glu			
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TTG	CAA	GAT	ATC	ATT	GCC	ATT	CTT	GGT	ATG	GAT	GAA	TTG	TCA	GAT	GAT			4479
Leu	Gln	Asp	Ile	Ile	Ala	Ile	Leu	Gly	Met	Asp	Glu	Leu	Ser	Asp	Asp			
		380					385					390						
GAA	AAA	ATT	CTC	GTT	GGA	CGT	GCA	CGT	CGT	ATC	CAA	TTC	TTC	CTT	TCA			4527
Glu	Lys	Ile	Leu	Val	Gly	Arg	Ala	Arg	Arg	Ile	Gln	Phe	Phe	Leu	Ser			
	395					400					405							
CAA	AAC	TTC	CAC	GTT	GCT	GAA	CAG	TTT	ACT	GGT	CAA	CCT	GGT	TCA	TAT			4575
Gln	Asn	Phe	His	Val	Ala	Glu	Gln	Phe	Thr	Gly	Gln	Pro	Gly	Ser	Tyr			
	410				415				420					425				
GTA	CCA	ATT	GAC	AAA	ACA	GTT	CAT	GAC	TTC	AAG	GAA	ATT	TTG	GAA	GGT			4623
Val	Pro	Ile	Asp	Lys	Thr	Val	His	Asp	Phe	Lys	Glu	Ile	Leu	Glu	Gly			
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AAA	TAT	GAC	GAA	GTC	CCT	GAA	GAT	GCT	TTC	CGT	GGA	GTA	GGT	CCA	ATT			4671
Lys	Tyr	Asp	Glu	Val	Pro	Glu	Asp	Ala	Phe	Arg	Gly	Val	Gly	Pro	Ile			
			445				450					455						
GAA	GAC	GTA	CTT	GCA	AAA	GCA	AAA	TCA	ATG	GGT	TAT	TAATTCGATT						4717
Glu	Asp	Val	Leu	Ala	Lys	Ala	Lys	Ser	Met	Gly	Tyr							
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9810089_final.txt

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485					490					495					500	
CAA	GCC	GGA	GAT	ATC	TCA	GCT	TAT	ATT	GCA	ACA	AAC	GTT	ATC	TCT	ATT	144
Gln	Ala	Gly	Asp	Ile	Ser	Ala	Tyr	Ile	Ala	Thr	Asn	Val	Ile	Ser	Ile	
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ACT	GAC	GGT	CAA	ATT	TTC	CTT	GAA	AAT	GAC	TTA	TTC	TAT	TCA	GGT	GTA	192
Thr	Asp	Gly	Gln	Ile	Phe	Leu	Glu	Asn	Asp	Leu	Phe	Tyr	Ser	Gly	Val	
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CGT	CCT	GCC	ATC	GAT	GCT	GGT	TCT	TCA	GTT	TCT	CGG	GTT	GGT	GGT	GCT	240
Arg	Pro	Ala	Ile	Asp	Ala	Gly	Ser	Val	Ser	Arg	Val	Gly	Gly	Gly	Ala	
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GCA	CAG	ATC	AAA	GCC	ATG	AAG	AAA	GTT	GCT	GGT	ACT	TTG	CGT	CTT	GAC	288
Ala	Gln	Ile	Lys	Ala	Met	Lys	Lys	Val	Ala	Gly	Thr	Leu	Arg	Leu	Asp	
		550				555					560					
CTT	GCG	TCA	TTC	CGT	GAA	CTT	GAA	GCC	TTT	ACT	CAA	TTT	GGT	TCT	GAT	336
Leu	Ala	Ser	Phe	Arg	Glu	Leu	Glu	Ala	Phe	Thr	Gln	Phe	Gly	Ser	Asp	
565					570					575					580	
CTT	GAT	GAA	GCG	ACT	CAA	GCA	AAA	TTG	AAT	CGT	GGT	CGT	CGT	ACC	GTT	384
Leu	Asp	Glu	Ala	Thr	Gln	Ala	Lys	Leu	Asn	Arg	Gly	Arg	Arg	Thr	Val	
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GAA	GTT	TTG	AAG	CAA	CCA	TTG	CAC	AAA	CCA	TTG	GCT	GTT	GAA	AAA	CAA	432
Glu	Val	Leu	Lys	Gln	Pro	Leu	His	Lys	Pro	Leu	Ala	Val	Glu	Lys	Gln	
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GTT	TTA	ATT	CTT	TAT	GCA	TTG	ACT	CAT	GGT	CAC	TTG	GAT	GAT	GTT	CCA	480
Val	Leu	Ile	Leu	Tyr	Ala	Leu	Thr	His	Gly	His	Leu	Asp	Asp	Val	Pro	
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GTT	GAT	GAC	GTC	CTT	GAT	TTT	GAA	ACA	AAC	AAT	GTC	CGA	TTC	TTC	GAT	528
Val	Asp	Asp	Val	Leu	Asp	Phe	Glu	Thr	Asn	Asn	Val	Arg	Phe	Phe	Asp	
		630				635					640					
GCA	AAT	TAT	GCA	AAA	CTC	TTG	AAC	GTG	ATT	ACT	GAA	ACT	AAA	GAT	TGC	576
Ala	Asn	Tyr	Ala	Lys	Leu	Leu	Asn	Val	Ile	Thr	Glu	Thr	Lys	Asp	Cys	
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CAG	AAG	AAG	CAA	AAC	TCG	ACG	AAG	CAA	TTA	AAG	CAT	TCT	AAA	ATA	CAA	624
Gln	Lys	Lys	Gln	Asn	Ser	Thr	Lys	Gln	Leu	Lys	His	Ser	Lys	Ile	Gln	
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CGA	ATT	ATT	AATAAGGAGG	CTAATCTA	ATG	GGA	GCT	TCA	CTT	AAT	GAA	ATA				675
Arg	Ile	Ile			Met	Gly	Ala	Ser	Leu	Asn	Glu	Ile				
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AAA	ACT	AAG	ATT	GCC	TCA	ACG	AAG	AAA	ACA	AGT	CAA	ATA	ACT	GGA	GCC	723
Lys	Thr	Lys	Ile	Ala	Ser	Thr	Lys	Lys	Thr	Ser	Gln	Ile	Thr	Gly	Ala	
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ATG	CAA	ATG	GTT	TCC	GCT	GCG	AAA	CTT	CAA	AAA	GCT	GAA	TCT	CAT	GCC	771
Met	Gln	Met	Val	Ser	Ala	Ala	Lys	Leu	Gln	Lys	Ala	Glu	Ser	His	Ala	
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AAA	GCA	TTT	CAA	ATT	TAT	GCT	GAA	AAA	GTT	CGT	AAA	ATT	ACA	ACT	GAT	819
Lys	Ala	Phe	Gln	Ile	Tyr	Ala	Glu	Lys	Val	Arg	Lys	Ile	Thr	Thr	Asp	
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TTA	GTT	TCC	TCT	GAC	AAA	GAG	CCA	GCT	AAG	AAT	CCA	ATG	ATG	ATA	GGA	867
Leu	Val	Ser	Ser	Asp	Lys	Glu	Pro	Ala	Lys	Asn	Pro	Met	Met	Ile	Gly	
			60					65					70			
AGA	GAA	GTC	AAA	AAA	ACT	GGC	TAT	CTT	GTA	ATT	ACT	TCG	GAT	CGT	GGA	915
Arg	Glu	Val	Lys	Lys	Thr	Gly	Tyr	Leu	Val	Ile	Thr	Ser	Asp	Arg	Gly	
		75					80					85				
CTT	GTC	GGT	GGC	TAT	AAT	TCA	TAT	ATT	TTG	AAA	TCT	GTC	ATG	AAT	ACT	963
Leu	Val	Gly	Gly	Tyr	Asn	Ser	Tyr	Ile	Leu	Lys	Ser	Val	Met	Asn	Thr	
		90				95					100					
ATC	CGT	AAA	CGT	CCT	GCT	AAT	GAA	AGT	GAA	TAT	ACT	ATT	CTT	GCA	CTT	1011
Ile	Arg	Lys	Arg	Pro	Ala	Asn	Glu	Ser	Glu	Tyr	Thr	Ile	Leu	Ala	Leu	
105					110					115					120	
GGC	GGT	ACT	GGA	GCA	GAT	TTC	TTC	GGA	GCA	AGC	AAT	GTT	AAA	AGT	TTC	1059
Gly	Gly	Thr	Gly	Ala	Asp	Phe	Phe	Gly	Ala	Ser	Asn	Val	Lys	Ser	Phe	
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9810089_final.txt

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Leu	Val	Leu	Cys	Gly	Phe	Ser	Asp	Gln	Pro	Asn	Phe	Glu	Glu	Val	Arg	
			140					145					150			
GCG	ATT	GTT	ACA	GAA	GCG	GTA	ACT	GAA	TAT	CAA	GCA	GAA	GAA	TTT	GAT	1155
Ala	Ile	Val	Thr	Glu	Ala	Val	Thr	Glu	Tyr	Gln	Ala	Glu	Glu	Phe	Asp	
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GAA	CTT	TAT	GTT	TGC	TAT	AAT	CAC	CAT	GTG	AAC	TCA	TTG	GTA	AGT	GAA	1203
Glu	Leu	Tyr	Val	Cys	Tyr	Asn	His	His	Val	Asn	Ser	Leu	Val	Ser	Glu	
			170				175				180					
GCA	AGT	ATG	GAA	AAA	ATG	TTG	CCT	ATT	TTT	TTT	GAA	GCA	TCA	GGT	CAA	1251
Ala	Ser	Met	Glu	Lys	Met	Leu	Pro	Ile	Phe	Phe	Glu	Ala	Ser	Gly	Gln	
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CAA	AAA	CCA	TTT	TTT	GAA	ACA	TTT	GAA	TTA	GAA	CCA	GAT	TGT	GAA	ACA	1299
Gln	Lys	Pro	Phe	Phe	Glu	Thr	Phe	Glu	Leu	Glu	Pro	Asp	Cys	Glu	Thr	
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Ile	Leu	Asn	Gln	Leu	Leu	Pro	Pro	Tyr	Ala	Glu	Ser	Met	Ile	Tyr	Gly	
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TCA	ATC	GTT	GAT	GCT	AAG	ACA	GCA	GAA	CAT	GCT	GCA	GGT	ATG	ACA	GCA	1395
Ser	Ile	Val	Asp	Ala	Lys	Thr	Ala	Glu	His	Ala	Ala	Gly	Met	Thr	Ala	
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ATG	CGT	ACT	GCA	ACT	GAT	AAT	GCT	CAC	TCT	GTT	ATC	AAT	GAT	TTG	ACT	1443
Met	Arg	Thr	Ala	Thr	Asp	Asn	Ala	His	Ser	Val	Ile	Asn	Asp	Leu	Thr	
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ATT	CAA	TAC	AAC	CGT	GCT	CGT	CAA	GCA	TCG	ATT	ACG	CAA	GAA	ATT	ACG	1491
Ile	Gln	Tyr	Asn	Arg	Ala	Arg	Gln	Ala	Ser	Ile	Thr	Gln	Glu	Ile	Thr	
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GAA	ATC	GTT	GCA	GGA	GCC	TCA	GCG	CTT	TAATTTACTG	ATAGGAATTC						1538
Glu	Ile	Val	Ala	Gly	Ala	Ser	Ala	Leu								
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AAAAATGAAT	AGAAATTCTG	TTCTTTGACA	GAAAAATAAAA	ACAGGAGGAA	AAACA	TTG										1656
						Leu										
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AGT	TCT	GGT	AAA	ATT	ACT	CAG	ATT	ATC	GGT	CCC	GTC	GTT	GAC	GTG	GAA	1704
Ser	Ser	Gly	Lys	Ile	Thr	Gln	Ile	Ile	Gly	Pro	Val	Val	Asp	Val	Glu	
			5					10					15			
TTT	GGT	TCT	GAT	GCC	AAA	TTG	CCT	GAG	ATT	AAC	AAT	GCC	TTG	ATT	GTC	1752
Phe	Gly	Ser	Asp	Ala	Lys	Leu	Pro	Glu	Ile	Asn	Asn	Ala	Leu	Ile	Val	
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Tyr	Lys	Asp	Val	Asn	Gly	Leu	Lys	Thr	Lys	Ile	Thr	Leu	Glu	Val	Ala	
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Leu	Glu	Leu	Gly	Asp	Gly	Ala	Val	Arg	Thr	Ile	Ala	Met	Glu	Ser	Thr	
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GAT	GGC	TTG	ACT	CGT	GGA	CTT	GAA	GTC	CTT	GAT	ACA	GGT	AAA	GCA	GTC	1896
Asp	Gly	Leu	Thr	Arg	Gly	Leu	Glu	Val	Leu	Asp	Thr	Gly	Lys	Ala	Val	
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AGC	GTT	CCT	GTT	GGG	GAA	GCC	ACT	CTT	GGT	CGT	GTT	TTT	AAC	GTC	CTT	1944
Ser	Val	Pro	Val	Gly	Glu	Ala	Thr	Leu	Gly	Arg	Val	Phe	Asn	Val	Leu	
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GGT	GAT	GTT	ATT	GAC	GGT	GGG	GAA	GAA	TTT	GCT	GCT	GAT	GCA	GAA	CGT	1992
Gly	Asp	Val	Ile	Asp	Gly	Gly	Glu	Glu	Phe	Ala	Ala	Asp	Ala	Glu	Arg	
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						120					125					
AAC	GAA	GTT	CTC	GTA	ACT	GGG	ATT	AAA	GTT	GTC	TTG	CTT	GCA	CCT		2088
Asn	Glu	Val	Leu	Val	Thr	Gly	Ile	Lys	Val	Val	Asp	Leu	Leu	Ala	Pro	
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TAC	CTT	AAA	GGT	GGT	AAA	GTT	GGA	CTT	TTC	GGT	GGT	GCC	GGA	GTT	GGT	2136
Tyr	Leu	Lys	Gly	Gly	Lys	Val	Gly	Leu	Phe	Gly	Gly	Ala	Gly	Val	Gly	

9810089_final.txt

AAA	GCC	GTC	CTT	ATT	CAA	GAA	TTG	AAA	CAC	AAC	ATC	GCC	CAA	GAA	CAC	2184
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TCA	GAT	GAT	CTT	GGT	GGT	GGT	TCA	ATG	ACT	GCC	TTG	CCA	ATC	ATC	CAA	94
Ser	Asp	Asp	Leu	Gly	Gly	Gly	Ser	Met	Thr	Ala	Leu	Pro	Ile	Ile	Gln	
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GAC	TTG	GCT	TCT	CAC	CGT	GAA	CTT	GAA	GCC	TTT	ACA	CAA	TTC	GGT	TCT	334
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GAT	TTG	GAT	GCC	GCA	ACA	GCT	AAA	CTT	AAT	CGT	GGA	CGT	CGT	ACA		382
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GTT	GAA	GTG	CTT	AAA	CAA	CCA	CTT	CAT	AAC	CCA	CTT	CCG	GTT	GAA	AAA	430
Val	Glu	Val	Leu	Lys	Gln	Pro	Leu	His	Asn	Pro	Leu	Pro	Val	Glu	Lys	
			315				320						325			
CAA	GTT	CTT	ATT	CTT	TAC	GCT	TTG	ACA	CAT	GGC	TTC	TTG	GAC	AGT	GTT	478
Gln	Val	Leu	Ile	Leu	Tyr	Ala	Leu	Thr	His	Gly	Phe	Leu	Asp	Ser	Val	
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CCG	GTT	GAT	CAA	ATC	TTG	GAT	TTT	GAA	GAA	GCC	CTC	TAT	GAC	TAC	TTT	526
Pro	Val	Asp	Gln	Ile	Leu	Asp	Phe	Glu	Glu	Ala	Leu	Tyr	Asp	Tyr	Phe	
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Asp	Ser	His	His	Glu	Asp	Ile	Phe	Glu	Thr	Ile	Arg	Ser	Thr	Lys	Asp	
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Gln	Ser	Glu	Tyr	Lys				Met	Ala	Gly	Ser	Leu				
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AGA	GAA	ATC	AAA	GCA	AAA	ATT	GCT	TCA	ATT	AAG	CAA	ACG	AGT	CAT	ATT	721
Arg	Glu	Ile	Lys	Ala	Lys	Ile	Ala	Ser	Ile	Lys	Gln	Thr	Ser	His	Ile	
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Thr	Gly	Ala	Met	Gln	Met	Val	Ser	Ala	Ser	Lys	Leu	Thr	Arg	Ser	Glu	
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CAG	GCT	GCT	AAA	GAT	TTC	CAA	ATC	TAT	GCC	TCA	AAA	ATT	AGA	CAG	ATC	817
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ACA Thr	ACA Thr	GAT Asp	CTT Leu	CTA Leu	CAT His	TCA Ser	GAA Glu	TTG Leu	GTT Val	AAT Asn	GGT Gly	TCT Ser	TCA Ser	AAT Asn	CCG Pro	865	
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ATG Met	TTG Leu	GAT Asp	GCA Ala	CGT Arg	CCA Pro	GTT Val	CGT Arg	AAG Lys	TCA Ser	GGG Gly	TAT Tyr	ATT Ile	GTC Val	ATT Ile	ACT Thr	913	
70																	
TCA Ser	GAT Asp	AAG Lys	GGA Gly	TTA Leu	GTT Val	GGA Gly	GGA Gly	TAT Tyr	AAT Asn	TCA Ser	ACC Thr	ATT Ile	CTT Leu	AAA Lys	GCT Ala	961	
90																	
GTC Val	TTG Leu	GAT Asp	ATG Met	ATT Ile	AAA Lys	CGT Arg	GAC Asp	CAT His	GAT Asp	TCT Ser	GAA Glu	GAT Asp	GAA Glu	TAT Tyr	GCT Ala	1009	
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GAT Asp	CAA Gln	GTC Val	GGG Gly	GAA Glu	ATC Ile	ATT Ile	CTA Leu	AAA Lys	GCT Ala	GTA Val	GGG Gly	ATG Met	TAT Tyr	CAA Gln	AAT Asn	1153	
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GAG Glu	CTT Leu	TTT Phe	GAT Asp	GAA Glu	CTT Leu	TAT Tyr	GTG Val	TGT Cys	TAC Tyr	AAT Asn	CAT His	CAT His	ATT Ile	AAT Asn	AGT Ser	1201	
170																	
TTG Leu	TTT Phe	TGT Cys	GAA Glu	GTT Val	TGT Cys	GTT Val	GAA Glu	AAA Lys	ATG Met	CTT Leu	CCA Pro	ATT Ile	GCT Ala	GAT Asp	TTT Phe	1249	
185																	
GAT Asp	CCT Pro	AAT Asn	GAA Glu	TTT Phe	GAA Glu	GGC Gly	CAT His	GTA Val	TTG Leu	ACC Thr	AAG Lys	TTT Phe	GAA Glu	TTG Leu	GAA Glu	1297	
200																	
CCA Pro	AGT Ser	TGT Cys	GAT Asp	ACT Thr	ATT Ile	TTG Leu	GAT Asp	CAA Gln	CTT Leu	TTG Leu	CCC Pro	ACA Thr	ATA Ile	GTC Val	GGT Gly	1345	
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GAG Glu	AGT Ser	TTT Phe	ATC Ile	TAC Tyr	GGT Gly	GCT Ala	ATC Ile	GTA Val	GAT Asp	GCC Ala	AAA Lys	ACA Thr	GCT Ala	GAG Glu	CAT His	1393	
230																	
GCT Ala	GCT Ala	GGT Gly	ATG Met	ACC Thr	GCA Ala	ATG Met	CAG Gln	ACT Thr	GCC Ala	ACT Thr	GAT Asp	AAT Asn	GCT Ala	AAG Lys	AAA Lys	1441	
250																	
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CTTCATAAGG AGAAAAACA ATG AGC TCA GGC AAA ATT GCT CAG GTT GTT GGT																	1648
Met 1 Ser Ser Gly Lys 5 Ile Ala Gln Val Val 10																	
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AAC Asn	AAT Asn	GCA Ala	TTG Leu	GTC Val	GTT Val	TAC Tyr	ACT Thr	GAG Glu	AAG Lys	AAA Lys	AGT Ser	CTT Leu	AGA Arg	CGG Arg	ATG Met	1744	
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ATT Ile	GCC Ala	ATG Met	GAA Glu	TCT Ser	ACT Thr	GAT Asp	GGA Gly	TTG Leu	ACT Thr	CGT Arg	GGG Gly	CTA Leu	GAA Glu	GTT Val	CTG Leu	1840	
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9810089_final.txt

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Arg	Val	Phe	Asn 95	Val	Leu	Gly	Asp	Thr 100	Ile	Asp	Met	Glu	Ala 105	Pro	Phe		
GCA	GAT	GAT	GCA	GAG	CGT	GAA	CCA	ATT	CAT	AAA	AAA	GCA	CCT	ACC	TTC	1984	
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Asp	Glu	Leu	Ser	Thr	Ser	Thr 130	Glu	Ile	Leu	Glu	Thr 135	Gly	Ile	Lys	Val		
ATC	GAC	TTG	CTT	GCC	CCT	TAT	CTT	AAA	GGT	GGT	AAA	GTC	GGA	CTT	TTC	2080	
Ile	Asp	Leu	Leu	Ala	Pro 145	Tyr	Leu	Lys	Gly	Gly 150	Lys	Val	Gly	Leu	Phe 155		
140	GGT	GGT	GCC	GGT	GTT	GGT	AAG	GCC	GTT	CTT	ATT	CAA	GAG	CTG	AAT	CAC	2128
Gly	Gly	Ala	Gly	Val 160	Gly	Lys	Ala	Val	Leu 165	Ile	Gln	Glu	Leu	Asn 170	His		
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Glu	Pro	Pro	Gly	Ala	Arg	Ala	Arg	Val	Ala	Leu	Thr	Gly	Leu	Thr	Ile		
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GCC	GAG	TAC	TTC	CGA	GAC	GAG	GAA	GGA	CAG	GAT	GTC	TTG	CTT	TTC	ATC		152
Ala	Glu	Tyr	Phe	Arg	Asp	Glu	Glu	Gly	Gln	Asp	Val	Leu	Leu	Phe	Ile		
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GAC	AAC	ATT	TTC	CGA	TTC	ACC	CAG	GCC	GGT	TCT	GAG	GTG	TCT	GCC	TTG		200
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CTT	GGT	CGA	ATT	CCC	TCC	GCC	GTC	GGA	TAC	CAG	CCC	ACT	CTT	TCC	ACC		248
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GAT	ATG	GGA	GGT	ATG	CAG	GAG	CGA	ATT	ACC	ACC	ACC	AAG	AAG	GGA	TCC		296
Asp	Met	Gly	Gly	Met	Gln	Glu	Arg	Ile	Thr	Thr	Thr	Lys	Lys	Gly	Ser		
	250				255					260							
ATC	ACT	TCC	GTC	CAG	GCC	GTC	TAC	GTG	CCT	GCT	GAT	GAT	TTG	ACC	GAT		344
Ile	Thr	Ser	Val	Gln	Ala	Val	Tyr	Val	Pro	Ala	Asp	Asp	Leu	Thr	Asp		
				270					275						280		
CCT	GCC	CCC	GCC	ACC	TTC	GCC	CAC	TTG	GAC	GCC	ACC	ACT	GTG	TTG			392
Pro	Ala	Pro	Ala	Thr	Thr	Phe	Ala	His	Leu	Asp	Ala	Thr	Thr	Val	Leu		
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TCT	CGA	GGT	ATC	GCT	GAG	TTG	GGT	ATC	TAC	CCC	GCT	GTC	GAT	CCC	CTT		440
Ser	Arg	Gly	Ile	Ala	Glu	Leu	Gly	Ile	Tyr	Pro	Ala	Val	Asp	Pro	Leu		
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GAT	TCT	AAG	TCC	CGA	ATG	CTC	GAC	CCC	CGA	ATT	GTC	GGA	CAG	GAG	CAC		488
Asp	Ser	Lys	Ser	Arg	Met	Leu	Asp	Pro	Arg	Ile	Val	Gly	Gln	Glu	His		
		315			320						325						
TAC	GAC	ATC	GCC	ACC	AAG	ACC	CAG	AAG	ATC	CTC	CAG	GAC	TAC	AAG	TCC		536
Tyr	Asp	Ile	Ala	Thr	Lys	Thr	Gln	Lys	Ile	Leu	Gln	Asp	Tyr	Lys	Ser		
		330			335						340						
CTC	CAG	GAT	ATC	ATT	GCC	ATT	CTT	GGT	ATG	GAT	GAG	TTG	TCT	GAG	GAG		584
Leu	Gln	Asp	Ile	Ile	Ala	Ile	Leu	Gly	Met	Asp	Glu	Leu	Ser	Glu	Glu		
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Asp	Lys	Leu	Thr	Val	Glu	Arg	Ala	Arg	Lys	Ile	Gln	Arg	Phe	Met	Ser		

98100891 - Final.txt																
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GTT Val	CCC Pro	TTG Leu	AAG Lys	ACT Thr	ACT Thr	TTG Leu	GAG Glu	TCC Ser	TTT Phe	AAG Lys	GAG Glu	CTT Leu	CTT Leu	TCC Ser	GGA Gly	728
GCC Ala	TGC Cys	GAC Asp	CAC His	CTC Leu	CCT Pro	GAG Glu	TCT Ser	GCT Ala	TTC Phe	TAC Tyr	ATG Met	GTT Val	GGT Gly	GAC Asp	ATC Ile	776
GCT Ala	GAT Asp	GTC Val	AAG Lys	GCC Ala	AAG Lys	GCT Ala	GCT Ala	GCC Ala	CAG Gln	GCT Ala	AAG Lys	GAG Glu	TTG Leu	GCT Ala	GCT Ala	824
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Page 12